General Recommendations on Immunization

Epidemiology and Prevention of Vaccine-Preventable Diseases

National Center for Immunization and Respiratory Diseases

Centers for Disease Control and Prevention

Revised March 2012

Principles of Vaccination

General Rule

Inactivated vaccines are generally not affected by circulating antibody to the antigen.

Live attenuated vaccines may be affected by circulating antibody to the antigen.

Antibody and Measles- and Varicella-Containing* Vaccines

Product Given First	Action
Vaccine	Wait 2 weeks before giving antibody
Antibody	Wait 3 months or longer before giving vaccine (See Table, Appendix A)

*except zoster vaccine

Products Containing Type-Specific or Negligible Antibody

- **Palivizumab (Synagis)**
  - contains only monoclonal RSV antibody
  - does not interfere with live virus vaccination
- **Red blood cells (RBCs), washed**
  - negligible antibody content

Principles of Vaccination

General Rule

All vaccines can be administered at the same visit as all other vaccines*

*exception: in asplenic children pneumococcal conjugate and Menactra brand meningococcal conjugate vaccines should not be administered at the same visit; separate these vaccines by at least 4 weeks

Spacing of Vaccine Combinations Not Given Simultaneously

Combination	Minimum Interval
Two live injected or intranasal influenza vaccine	4 weeks
All other	None*

*exception: in asplenic children pneumococcal conjugate and Menactra brand meningococcal conjugate vaccines should not be administered at the same visit; separate these vaccines by at least 4 weeks

Nonsimultaneous Administration of Two Live Parenteral Vaccines

- Interference can occur between two live vaccines given less than 28 days apart
- If two live parenteral vaccines, or live intranasal influenza vaccine, are given less than 28 days apart the vaccine given second should be repeated
- Exception is yellow fever vaccine given less than 4 weeks after measles vaccine

Principles of Vaccination

General Rule

Increasing the interval between doses of a multidose vaccine does not diminish the effectiveness of the vaccine*

Decreasing the interval between doses of a multidose vaccine may interfere with antibody response and protection

*after the series has been completed

Minimum Intervals and Ages

Vaccine doses should not be administered at intervals less than the minimum intervals or earlier than the minimum age

Violation of Minimum Intervals or Minimum Age

- ACIP recommends that vaccine doses given up to four days before the minimum interval or age be counted as valid
- Immunization programs and/or school entry requirements may not accept all doses given earlier than the minimum age or interval

MMWR 2011;60(RR 2):5

Extended Interval Between Doses

- Not all permutations of all schedules for all vaccines have been studied
- Available studies of extended intervals have shown no significant difference in final titer
- It is not necessary to restart the series or add doses because of an extended interval between doses

Vaccine Adverse Reactions

- **Adverse reaction**
  - extraneous effect *caused by vaccine*
  - side effect

- **Adverse event**
  - *any* event following vaccination
  - may be true adverse reaction
  - may be only coincidental

Vaccine Adverse Reactions

- **Local**
  - pain, swelling, redness at site of injection
  - common with inactivated vaccines
  - usually mild and self-limited

Vaccine Adverse Reactions

- **Systemic**
  - fever, malaise, headache
  - nonspecific
  - may be unrelated to vaccine

Live Attenuated Vaccines

- Must replicate to produce immunity
- Symptoms usually mild
- Occur after an incubation period (usually 7-21 days)

Vaccine Adverse Reactions

- **Allergic**
  - due to vaccine or vaccine component
  - rare
  - risk minimized by screening

VACCINE ADVERSE EVENT REPORTING SYSTEM (VAERS)
www.vaers.hhs.gov

Contraindication

- A condition in a recipient that greatly increases the chance of a serious adverse reaction

Precaution

- A condition in a recipient that might increase the chance or severity of an adverse reaction, or
- Might compromise the ability of the vaccine to produce immunity

Contraindications and Precautions

Permanent contraindications to vaccination:

- **Severe allergic reaction to a vaccine component or following a prior dose**
- **Encephalopathy not due to another identifiable cause occurring within 7 days of pertussis vaccination**
- **Severe combined immunodeficiency (rotavirus vaccine)**
- **History of intussusception (rotavirus vaccine)**

Contraindications and Precautions

Condition	Live	Inactivated
Allergy to component	C	C
Encephalopathy	---	C
Pregnancy	C	V*
Immunosuppression	C	V
Severe illness	P	P
Recent blood product	P**	V

C=contraindication P=precaution V=vaccinate if indicated

*except HPV. **MMR and varicella containing (except zoster vaccine) only

Vaccination of Pregnant Women

- Live vaccines should not be administered to women known to be pregnant
- In general inactivated vaccines may be administered to pregnant women for whom they are indicated
- HPV vaccine should be deferred during pregnancy

Tdap Recommendations for Pregnant Women

- Healthcare personnel should implement a Tdap vaccination program for pregnant women who previously have not received Tdap
- Administer Tdap during pregnancy, preferably during the third or late second trimester (after 20 weeks' gestation)
- If not administered during pregnancy, Tdap should be administered immediately postpartum

Vaccination of Immunosuppressed Persons

- Live vaccines should not be administered to severely immunosuppressed persons
- Persons with isolated B-cell deficiency may receive varicella vaccine
- Inactivated vaccines are safe to use in immunosuppressed persons but the response to the vaccine may be decreased

Immunosuppression

- **Disease**
  - congenital immunodeficiency
  - leukemia or lymphoma
  - generalized malignancy
- **Chemotherapy**
  - alkylating agents
  - antimetabolites
  - radiation

Immunosuppression

- **Corticosteroids**
  - 20 mg or more per day of prednisone*
  - 2 mg/kg or more per day of prednisone*
  - NOT aerosols, alternate day, short courses, topical

*for 14 days or longer

Live Attenuated Vaccines for Persons with HIV/AIDS*

Vaccine	Asymptomatic	Symptomatic
Varicella	Yes	No
Zoster	No	No
MMR	Yes	No
MMRV	No	No
LAIV	No	No
Rotavirus	No	No
Yellow fever	Consider	No

Yes=vaccinate No=do not vaccinate

*see specific ACIP recommendations for details.

Vaccination of Hematopoietic Cell Transplant (HCT) Recipients

- Antibody titers to VPDs decline during the 1-4 years after allogeneic or autologous HCT if the recipient is not revaccinated
- HCT recipients are at increased risk of some VPDs, particularly pneumococcal disease
- Revaccination recommended beginning 6-12 months post-transplant

MMWR 2011;60(No. RR 2)

Vaccination of Hematopoietic Stem Cell Transplant Recipients

- **Inactivated influenza vaccine at least 6 months following transplant and annual thereafter**
- **Inactivated vaccines (DTaP/Td, IPV, hepatitis B, Hib, PCV, PPV) at 12 months**
- **MMR and varicella vaccines at 24 months if immunocompetent**
- **Meningococcal and Tdap vaccines**
  - few data on the safety and efficacy
  - case by case decision by the clinician

***MMWR* 2000;49(RR 10) and *MMWR* 2006;55(RR 15)**

Vaccination of Household Contacts of Immunosuppressed Persons

- Healthy household contacts of immunosuppressed persons should receive MMR and varicella vaccines and annual influenza vaccination

Invalid Contraindications to Vaccination

- Mild illness
- Antimicrobial therapy
- Disease exposure or convalescence
- Pregnant or immunosuppressed person in the household
- Breastfeeding
- Preterm birth
- Allergy to products not present in vaccine or allergy that is not anaphylactic
- Family history of adverse events
- Tuberculin skin testing
- Multiple vaccines

Screening Questions

- Is the child (or are you) sick today?
- Does the child have an allergy to any medications, food, or any vaccine?
- Has the child had a serious reaction to a vaccine in the past?
- Has the child had a seizure, brain or nerve problem?
- Does the child have cancer, leukemia, AIDS, or any other immune system problem?

Vaccination During Acute Illness

- No evidence that acute illness reduces vaccine efficacy or increases vaccine adverse reactions
- Vaccines should be delayed until the illness has improved
- Mild illness, such as otitis media or an upper respiratory infection, is NOT a contraindication to vaccination

Screening Questions

- Has the child taken cortisone, prednisone, other steroids, or anticancer drugs, or had x-ray treatments in the past 3 months?
- Has the child received a transfusion of blood or blood products, or been given a medicine called immune (gamma) globulin in the past year?
- Is the child/teen pregnant or is there a chance she could become pregnant during the next month?
- Has the child received vaccinations in the past 4 weeks?

CDC Vaccines and Immunization

Contact Information

Telephone	800.CDC.INFO
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